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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. 902-578-2
First Inventor or Application Identifier F. Van Der Putten
Title Method to Synchronize Data and a Transmitter and a Receiver, etc.
Express Mail Label No. EL 092377405 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

- ☐ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
- ☒ Specification [Total Pages 9]
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 1]
- Oath or Declaration [Total Pages 3]
 - ☐ Newly executed (original or copy)
 - ☒ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

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- ☐ Microfiche Computer Program (Appendix)
- Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - ☐ Computer Readable Copy
 - ☐ Paper Copy (identical to computer copy)
 - ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

- ☒ Assignment Papers (cover sheet & document(s))
- ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney (when there is an assignee)
- ☐ English Translation Document (if applicable)
- ☐ Information Disclosure Statement (IDS)/PTO-1449
- ☐ Preliminary Amendment to follow shortly
- ☒ Return Receipt Postcard (MPEP 503) after receipt of SN
(Should be specifically itemized)
- ☐ * Small Entity Statement(s) filed in prior application, Status still proper and desired (PTO/SB/09-12)
- ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
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16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: 08, 965, 136
Prior application information: Examiner C. Tran Group / Art Unit: 2746

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label

004955

or ☐ Correspondence address below

(Insert Customer No. or Attach bar code label here)

Name	Francis J. Maguire				
Address	Ware, Fressola, Van Der Sluys & Adolphson 755 Main Street, PO Box 224,				
City	Monroe	State	CT	Zip Code	06468
Country	USA	Telephone	(203) 261-1234	Fax	(203) 261-5676

Name (Print/Type)	Francis J. Maguire	Registration No. (Attorney/Agent)	31,391
Signature	Francis J. Maguire	Date	March 29, 1999

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902-578-2
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: F. Van Der Putten et al

Serial No.: 0 /

Group No.:

Filed: Herewith

Examiner:

For: A Method to Synchronize Data and a Transistor and a
Receiver Realizing Said Method

Commissioner of Patents and Trademarks

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Utility Patent Application Transmittal (Cont.)
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(First Page of Letter to PTO [8-1])

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RECEIVER REALISING SAID METHOD

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synchronise data as described in claim 1, and the transmitter and the receiver realising the method as described in claim 4 and claim 6, respectively.

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the required level of error performance and without making the receiver too complex.

Another characteristic feature of the present invention is that the data, sent from the transmitter to the receiver, is asynchronous data. Indeed, upon receipt of the trigger signals, the transmitter must be able to send data even if the trigger signals are sent in an asynchronous way. This is for instance the case when the receiver has to receive the data at a time moment at which the data has just to fit at a predefined place in a frame. In this way frame synchronisation is achieved.

Yet another characteristic feature of the present invention is that in the event that no data is available in the transmitter to be sent upon receipt of the trigger signals, the transmitter is able to generate idle data and to send this idle data to the receiver. In this way, e.g. the frame synchronisation process is not disturbed. This is described in the method of claim 3 and the transmitter of claim 8.

An important application of the present invention is that the receiver is included in an asymmetric digital subscriber line (ADSL) modem. This is described in claim 5. In such receiver, the received data is framed into an asymmetric digital subscriber line frame and sent over twisted pair. However in known ADSL modems using the known synchronisation methods, when the modem receives data at a higher frequency than the frequency at which the data is sent, the data has to be buffered before being framed. As already mentioned above, it is important to keep the complexity of a receiver in such a modem low. By using the method of the invention, the asymmetric digital subscriber line modem gets rid of the buffering aspect. In fact the buffering is again moved from the receiver to the transmitter which now must be able to buffer the data until he receives a trigger signal of the receiver to have the permission to send the data to the receiver. Therefore, this way of synchronising is especially suited for systems wherein there is anyway buffering foreseen at the transmitting side, e.g. for Asynchronous Transmission Mode (ATM) systems.

The above mentioned and other objects and features of the invention will become more apparent and the invention itself will be best understood by referring to the following description of an embodiment taken in conjunction with the accompanying figure which is a block scheme of a synchronisation system including a transmitter and a receiver realising the method of the invention.

Referring to the figure, the working of the synchronisation system will be described. First, the working of the synchronisation system will be explained by means of a functional description of the blocks shown in the Figure. Based on this description implementation of the functional blocks will be obvious to a person skilled in the art and will therefor not be described in detail. In addition, the principle working of the synchronisation system will be described in further detail.

The synchronisation system includes a transmitter TX and an asymmetric digital subscriber line modem (ADSL modem) ADSL.

The transmitter TX includes four functional blocks :

- a buffer BUF;
- an idle data generating means ID-GEN ;
- a data sending means DAT-SEND; and
- a trigger receiving means T-RX.

The buffer BUF is included to buffer the data DAT presented to the transmitter TX. This data DAT can be digital data of any kind, however, for this embodiment the data DAT is asynchronous data i.e. data organised following the asynchronous transfer mode (ATM) technique. As mentioned, the buffer BUF buffers the data DAT presented to the transmitter TX. However, it has to be understood that the buffer BUF will only do this when it is necessary i.e. when the transmitter receives more data DATA then he is allowed to send.

The idle data generating means ID-GEN is included to generate idle data. It has to be remarked that this one of the typical ATM functionalities. Idle data is sent whenever there is no information available at the side of the sender at the moment of transmission. They allow a full asynchronous operation of both sender and receiver.

The data sending means DAT-SEND is included to send data from the transmitter TX to the ADSL modem. This data can be useful user information i.e. the data DAT coming from the buffer BUF or idle data, coming from the idle data generating means ID-GEN.

- 5 The trigger receiving means T-RX is included to receive trigger signals T coming from the ADSL modem. Upon receipt of such a trigger signal, the data sending means DAT-SEND is on his turn triggered by the trigger receiving means T-RX and is allowed to send data.

- 10 The ADSL modem includes besides a receiver RX also the characteristic functional blocks of an ADSL modem. Since the description of the ADSL technology goes beyond the scope of this invention, these functional blocks are not shown in the figure. However, it is worth to mention here that one of the functional blocks of such an ADSL modem is a framer which organizes overhead information and user information i.e. the incoming data DAT into ADSL frames,
- 15 i.e. uniformly sized groups of bits used to organize the ADSL data stream.

The receiver RX includes three functional blocks :

- trigger generating means T-GEN;
- trigger sending means T-SEND; and
- data receiving means DAT-RX.

- 20 The trigger generating means T-GEN is included to generate trigger signals T from an available signal SIG in the receiver RX. This available signal SIG is generated in accordance with the time moments whenever data DAT is needed to fit into an available ADSL frame on a predetermined place. This signal S is not necessary a clock signal. Indeed, looking to the form of an ADSL
- 25 frame, not the whole frame must be filled with data DAT, so by consequence, the signal S is not a signal with a constant frequency.

- 30 It has to be remarked here that the trigger signals T are allowed to be of any kind e.g. one single bit pulse or a predefined codeword as long as the trigger generating means T-GEN of the receiver RX and the trigger receiving means T-RX of the transmitter TX are lined up with each other.

The trigger sending means T-SEND is included to send the trigger signals T from the receiver RX to the transmitter TX and the data receiving means DAT-RX is included to receive the data DAT coming from the transmitter TX.

5 The transmission medium for sending the trigger signals is in the figure depicted as a separate line to simplify the description of the working of the system. However these signals can (and usually are) transmitted over the same transmission medium, i.e. twisted pair, as the data.

The principle working of the synchronisation system will be described in the following paragraph.

10 Whenever data DAT is needed to fit in an available ADSL frame on a predetermined place, a trigger signal T is generated from the available signal SIG and transmitted to the transmitter TX. Upon receipt of a trigger signal T the trigger receiving means T-RX gives a signal to the data sending means DAT-SEND, e.g. by means of a control signal, and DAT-SEND on his turn requests
15 data DAT to the buffer BUF. When there is data DAT available in the buffer BUF, the data DAT is provided to the data sending means DAT-SEND. However, when no data DAT is available in the buffer, the synchronisation process may not be disturbed and the data sending means DAT-SEND requests idle data to the idle data generating means ID-GEN. The data, either user data or idle data, is
20 sent to the receiver RX and arrives there at the right moment to fit immediately into the ADSL frame on the predetermined place whereby synchronisation is established between the data DAT and the available signal SIG.

It has to be remarked that upon receipt of a trigger signal T, the transmitter TX has to send data DAT to the receiver RX. Sending data can be
25 done immediately after receiving of the trigger signal T, however the invention is not restricted to such kind of synchronisation systems but is also applicable for synchronisation systems where the data DAT is only sent after a predetermined period. Indeed, in this particular embodiment, the total period between the moment of generating a particular trigger and the moment of data DAT arriving
30 at the receiver RX to fit into a according predefined ADSL frame must be taken into account at initialisation time. It can be necessary to have a predetermined

waiting period somewhere in the loop in order to be able to realise the synchronisation. Since the complexity is moved from the receiver RX to the transmitter TX, this waiting period will also be realised by the transmitter TX.

- 5 It has to be remarked that due to the cell structure of the ATM data stream whenever idle data, not corresponding to a complete idle cell has been sent, that upon receipt of subsequent trigger signals T idle data has to be sent until the complete idle cell is transmitted, even if in the mean time some data DAT becomes available in the buffer BUF.

- 10 While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.

CLAIMS

1. A method to realise synchronisation in a receiver (RX), of data (DAT) sent from a transmitter (TX) to said receiver (RX), with a signal (SIG) available in
5 said receiver (RX), characterised in that said method includes the steps of :

- in said receiver (RX) generating trigger signals (T) from said signal (SIG);

- sending said trigger signals (T) from said receiver (RX) to said transmitter (TX);

10 - upon receipt of said trigger signals (T) by said transmitter (TX) sending said data (DAT) from said transmitter (TX) to said receiver (RX).

2. The method according to claim 1, characterised in that said data (DT) is asynchronous data.

3. The method according to claim 1, characterised in that said
15 method further includes in the event that no data is available in said transmitter (TX) to be sent upon receipt of said trigger signals, sending idle data from said transmitter (TX) to said receiver (RX).

4. A receiver (RX) for receiving from a transmitter (TX) data (DAT), said data (DAT) having to be synchronous with a signal (SIG) available in said receiver
20 (RX), characterised in that said receiver (RX) includes:

- trigger generating means (T-GEN) to generate trigger signals (T) from said signal (SIG);

- trigger sending means (T-SEND) to send said trigger signals (T) from said receiver (RX) to said transmitter (TX);

25 - data receiving means (DAT-RX) to receive said data (DAT) sent by said transmitter (TX) upon receipt of said trigger signals (T) to said receiver (RX).

5. The receiver (RX) according to claim 4, characterised in that said receiver (RX) is included in an asymmetric digital subscriber line modem.

6. A transmitter (TX) for transmitting data (DAT) to a receiver (RX), said
30 data (DAT) having to be synchronous with a signal (SIG) available in said receiver (RX), characterised in that said transmitter (TX) includes :

5 - data sending means (DAT-SEND) to send data (DAT) from said transmitter (TX) to said receiver (RX) upon receipt of said trigger signals (T).

8. The transmitter (TX) according to claim 6, characterised in that said transmitter (TX) includes idle data generating means (ID-GEN) to generate idle data and to send said idle data from said transmitter (TX) to said receiver (RX) in the event that no data (DAT) is available in said transmitter (TX) upon receipt of said trigger signals (T).

ABSTRACT

**A METHOD TO SYNCHRONISE DATA AND A TRANSMITTER AND A
RECEIVER REALISING SAID METHOD**

5 A method to realise synchronisation in a receiver (RX), of data (DAT) sent from a transmitter (TX) to the receiver (RX), with a signal (SIG) available in the receiver (RX). The method includes the following steps :

- in the receiver (RX) generating trigger signals (T) from the signal (S);
- sending the trigger signals (T) from the receiver (RX) to the

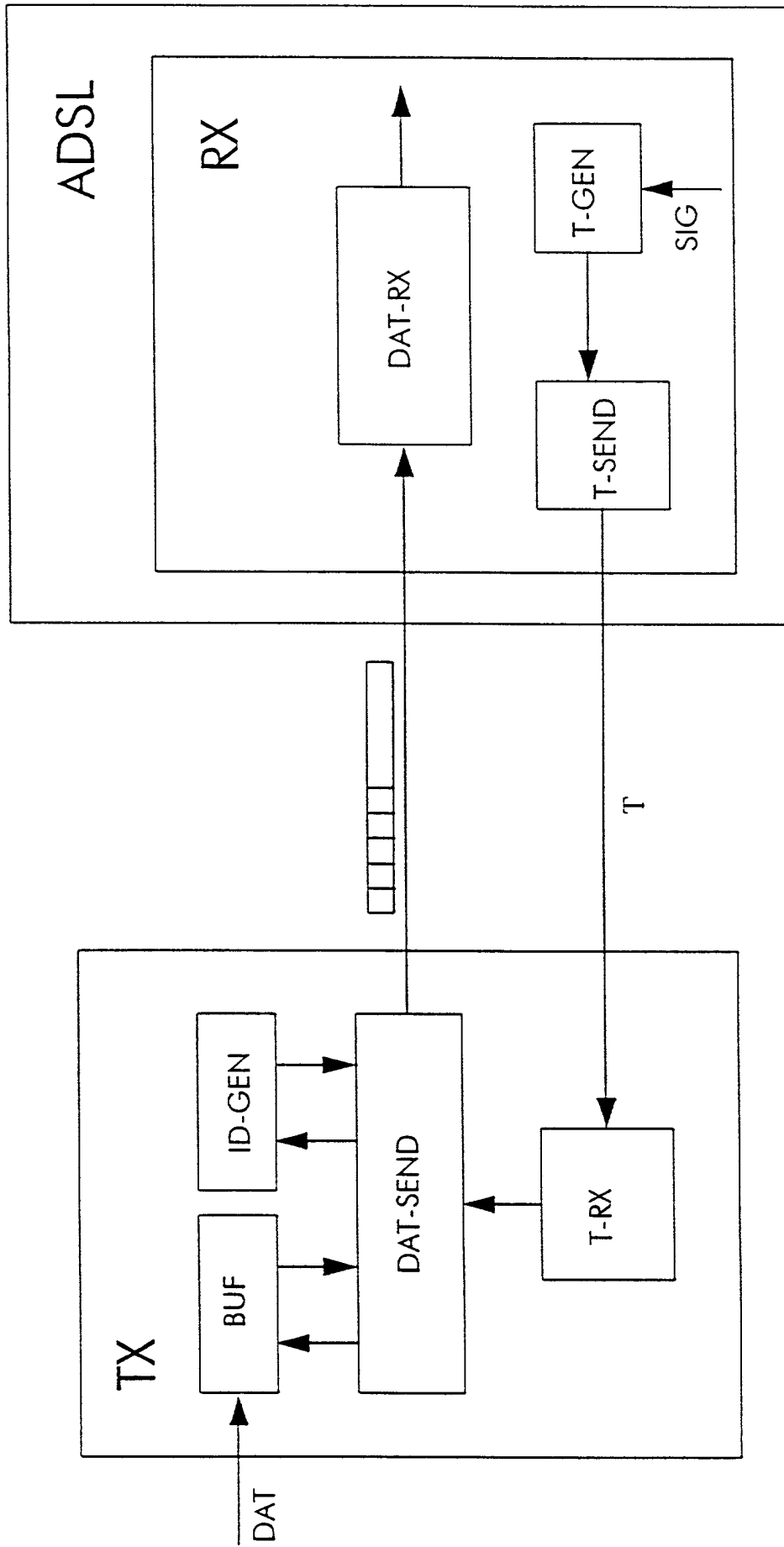
10 transmitter (TX);

- upon receipt of the trigger signals (T) by the transmitter (TX) sending the data (DAT) from the transmitter (TX) to the receiver (RX).

(figure)

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Patent and Trademark Office—U.S. DEPARTMENT OF COMMERCE

German Language Declaration

Prior foreign applications

Priorat beansprucht

Priority Claimed

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(Nummer) (Land) (Tag/Monat/Jahr eingereicht)

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Ja

☐ No
Nein

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Ja

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Nein

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☐ Yes
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☐ No
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German Language Declaration

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Garold E. Bramblett, Reg.No. 19,119
James R. Frederick, Reg. No. 25,865

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Robert H. Ware, Reg. No. 18,179
Alfred A. Fressola, Reg. No. 27,550
K. Bradford Adolphson, Reg. No. 30,927
Francis J. Maguire, Reg. No. 31,391
William J. Barber, Reg. No. 32,720
Peter H. Van Winkle, Reg. No. 36,039
Michael Grillo, Reg. No. 34,612

Telefongespräche bitte richten an:
(Name und Telefonnummer)

Direct Telephone Calls to: (name and telephone number)
(203) 261-1234

Postanschrift:

Send Correspondence to:
WARE, FRESSOLA, VAN DER SLUYS
& ADOLPHSON
755 Main Street, PO Box 224
Monroe CT 06468

Voller Name des einzigen oder ursprünglichen Erfinders:		Full name of sole or first inventor	
		Frank Octaaf VAN DER PUTTEN	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
		Frank Octaaf Van der Putten	20/10/1997
Wohnsitz		Residence	
		HOMBEEK, Belgium	
Staatsangehörigkeit		Citizenship	
		Belgian	
Postanschrift		Post Office Address	
		Vinkstraat 2, B-2811 HOMBEEK	
		BELGIUM	
Voller Name des zweiten Miterfinders (falls zutreffend)		Full name of second joint inventor, if any	
		Paul Marie Pierre SPRUYT	
Unterschrift des Erfinders	Datum	Second inventor's signature	Date
		Paul Marie Pierre Spruyt	20/10/1997
Wohnsitz		Residence	
		HEVERLEE, Belgium	
Staatsangehörigkeit		Citizenship	
		Belgian	
Postanschrift		Post Office Address	
		Prinses Lydialaan 54, B-3001 HEVERLEE	
		BELGIUM	

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

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